

Remote Dental Consultation System

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INTRODUCTION AND OVERVIEW

A prototype Remote Dental Consultation System (RDCS) was developed and tested through an iterative process that employed the skills and expertise of the research team as well as a number of important future user groups—general dentists and specialists, members of the review panel (including five specialties), and dental office administrative staff persons.

The project was planned for three phases:

1. Phase I (complete). Development and initial testing of a prototype RDCS, including image testing
2. Phase II (under way). Refinement of the prototype, simulated field testing, and preliminary analysis of consumer and practitioner acceptance and adoption
3. Phase III (proposed). Field testing of the system by practitioners in Pennsylvania and Oregon, a national symposium on barriers to teledentistry to address particular issues facing teledentistry due to differences in reimbursement, and licensing as compared to medicine

METHODOLOGY

Readily available, inexpensive desktop computers and scanners were used throughout the project to ensure that the prototype system would be easily adopted in practice situations. A variety of methods were used to gather qualitative and quantitative data throughout the development of a prototype system, image testing, and case simulation.

KEY FINDINGS

A great deal of data and practical information were generated by the project. These data fall into four major categories: (1) image testing, (2) surveys, (3) case simulation, and (4) consultation costs.

Image Testing

In Phase I, all three image modalities (digitally acquired, scanned, and traditional) were of

acceptable diagnostic quality (receiver operating characteristic [ROC] $\geq .80$). No significant differences were found in diagnostic acceptability among the three image modalities; by all analyses (ROC, diagnostic accuracy, and preference); overall, traditional was best, scanned second, and digital third.

In Phase II, image preferences according to case type and specialty of reviewer are being analyzed as are characteristics of images that influence preference.

Surveys

General Practitioners. In Phase I, general practitioners showed some significant changes in their perceptions as a result of reviewing the prototype and a case simulation. Seeing a demonstration of the prototype resulted in a statistically significant change in the practitioners' perceptions of the diagnostic quality of radiographs that can be presented, security of patient information sent over the Internet, and helpfulness of a remote consultation system.

In Phase II to date, 22 dentists have completed the evaluation. Overall, respondents (on postsurvey) are positive about (1) computers in practice—100 percent strongly/somewhat agree that computers are essential in today's dental practice (mean=1.27; scale: 1=strongly agree to 5=strongly disagree); (2) Internet-based consultation—65 percent strongly/somewhat agree that dental consultation can be successfully completed via the Internet (mean=2.27); and (3) RDCS—81 percent strongly/somewhat agree that RDCS would improve the quality of patient care (mean=1.73). Respondents were less positive about security, with 53 percent strongly/somewhat agreeing that patient information can be sent securely over the Internet (mean=2.45), but 77 percent indicated that they would be comfortable doing it. A statistically significant difference ($P < 0.05$, paired t -test) was found, presurvey to postsurvey, regarding increased agreement that patients (presurvey mean=2.36, postsurvey mean=1.96) are more likely to agree to

consultation if they can use RDCS rather than a traditional consult.

Administrative Staff. In Phase I, administrative dental office staff members were enthusiastic about the RDCS, particularly the time saved by the staff, dentist, and patient. Main areas of concern for the staff were patient centered—security of confidential patient information and loss of patient involvement in the consultation process.

Case Simulation

Overall, reviewers in both Phases I and II have been positive about the system. The best features of the prototype were identified as ease of use, time saved and efficiency, and quality of image.

Costs of Consultation

The process of traditional and remote dental consultation were mapped, costs associated with traditional and remote consultation were identified, and a pilot survey was administered to patients in five locations. Preliminary analyses of these data indicate that patients value the potential time and travel savings. For example, when asked to rank agreement with the statement “I think letting my dentist use the Internet to send my records to another dentistry for his/her opinion is a good idea,” the mean response was 2.13 on a scale of 1=strongly agree to 5=strongly disagree.

CONCLUSION

An RDCS has been developed and evaluated. Practitioners and consumers thus far are positive about the use of such a system in patient care.

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